

Unmanned Combat Aerial Vehicle - Air Force (UCAV-AF)

The unmanned combat air vehicle (UCAV) is an autonomous, stealthy, unmanned strike aircraft. The aircraft will carry advanced sensors for target acquisition, electronic support measures, and air-to-ground weapons. A weapon has not yet been selected, but candidates include Joint Direct Attack Munition and the small diameter bomb. Incorporation of electronic attack capabilities is planned for future spirals. Air vehicles are monitored and re-tasked from a ground station connected via Line-of-sight (LOS) and Beyond-line-of-sight (BLOS) data links. The operations concept has been designed to offer reduced operations and support costs compared to manned attack aircraft. The concept includes storing UCAVs in containers for up to 10 years prior to use and extensive use of simulation during training. The system is also being designed to allow one operator to control up to four air vehicles.

The initial role chosen for UCAV is suppression of enemy air defenses (SEAD). The mission role is seen as evolving from a preemptive to a reactive SEAD mission. Preemptive SEAD involves attacking known, generally fixed, air defenses at the beginning of the campaign for air superiority. Reactive SEAD is a more dynamic mission and involves protecting friendly aircraft.

The Defense Advanced Research Programs Agency (DARPA) is currently the developing agency for UCAV. The program will be transferred to the Air Force in FY03. The system is being developed using a spiral development approach, concurrently developing, producing, testing, and fielding systems in blocks. The current prototype air vehicles, X-45A, will migrate from Block 1 to Block 4. The next series of prototypes, X-45B will be Block 5. The first operational capability will reside in the Block 20, A-45 systems. The Air Force is planning to request an Authority to Proceed (ATP) decision to begin development and procurement of the Block 10 systems. Congressional Language calls for 30 operational UCAV systems by 2010; accordingly, the Air Force is planning to deliver 14 Block 10 UCAVs between 2006 through 2008 and 16 Block 20 UCAVs between 2009 through 2010. The Block 20 is envisioned as the production representative system. A total of 132 production air vehicles are currently planned.

A number of improvements are planned in order to produce an operational system from the existing X-45A aircraft. DARPA and Boeing have agreed to a contract extension that will deliver the X-45B, a second demonstration vehicle that is larger, more capable, and incorporates low observable technology. However, payloads will not be incorporated until the A-45 aircraft are developed.

The Air Force has identified the UCAV as a "Pathfinder Program" for an acquisition streamlining effort intended to field key capabilities to the warfighter as quickly as possible using spiral development. This effort intends to improve both the requirements generation process and the combined Developmental Test/Operational Test process. A collaborative requirement working group and integrated verification team has been established to support the Pathfinder efforts. Although the contractor has a well-developed demonstration program, the evaluation concept for the first 30 operational air vehicles is still not defined.



The Air Force intends to develop Unmanned Combat Aerial Vehicle using a spiral development approach, concurrently developing, producing, testing, and fielding systems.

AIR FORCE PROGRAMS

TEST & EVALUATION ACTIVITY

To date, test activity has been conducted at NASA Dryden Space Center under a joint DARPA, Air Force, Boeing system demonstration program. The X-45A's first flight occurred on May 22, 2002, and lasted 14 minutes. Testing prior to the first flight included ground and taxi tests. Preliminary operational test planning has also begun inside the Air Force in anticipation of the transition to an Air Force-led formal acquisition program in FY03.

TEST & EVALUATION ASSESSMENT

The Air Force UCAV represents a significant leap in the roles, missions, and capabilities of Unmanned Aerial Vehicles (UAVs). UCAV will be required to survive and be effectively employed in an environment unprecedented for UAVs. Other firsts are plans for in-flight refueling of a UAV, and air vehicle-to-operator ratios of up to four-to-one. Integration with strike packages, low observability maintenance, long-term storage, and extensive use of simulation in training are other operational aspects of system performance that will require thorough testing. End-to-end, mission level evaluations of the system's capability will be required to measure performance before buying and fielding.